Altitude Illness Prevention and Treatment

Terminal Learning Objective

Action: Manage altitude illness

Condition: You are a Soldier deployed to the field at altitudes of 8,000 to 18,000 feet. You are given the Extended Cold Weather Clothing System (ECWCS), other issued cold weather clothing items, the issued cold weather sleep system with insulating pad, access to a warming shelter, a portable hyperbaric chamber, and the requirement to protect yourself and your fellow Soldiers against altitude illness.

Standard: Apply preventive medicine countermeasures to prevent altitude illness. Identify the signs and symptoms of altitude

Where does the hazard exist?

- **Performance issues begin at 4,000 feet.**
- **Serious illness occurs above 8,000 feet.**
- **Human habitation occurs up to 18,000 feet.**
- **Above 18,000 feet your body deteriorates.**
- **U.S. Army Altitude Classifications:**
  - **Low: Sea Level to 5,000 feet**
  - **Moderate: 5,000-8,000 feet**
  - **High: 8,000-14,000 feet**
  - **Very High: 14,000-18,000**
  - **Extreme: 18,000 and higher**

Reference: *FM 3-97.6 Mountain Operations*

Why does the hazard exist?

- **Higher altitude equals lower barometric pressure**
- **Lower barometric pressure means less oxygen is available to you**
- **Less oxygen available leads to decreased oxygen in your blood stream – hypoxia**
- **Hypoxia sets the stage for performance issues, acclimatization and possibly altitude illness**

Sea level vs. 18,000 feet

Box of air at Sea Level

- **Pressure: 760mmHg**
- **1000 molecules of air**
- **210 oxygen molecules**
- **780 nitrogen molecules**
- **10 molecules other**

Box of air at 18,000 fee

- **Pressure: 380 mmHg**
- **500 molecules of air**
- **105 oxygen molecules**
- **390 nitrogen molecules**
- **5 molecules other**

What four factors affect your response to altitude?

1. **The altitude you move to.**

2. **Your rate of ascent.**

3. **The altitude you slept at before moving to the new altitude.**

4. **Individual factors such as your genetic make-up and physiology.**

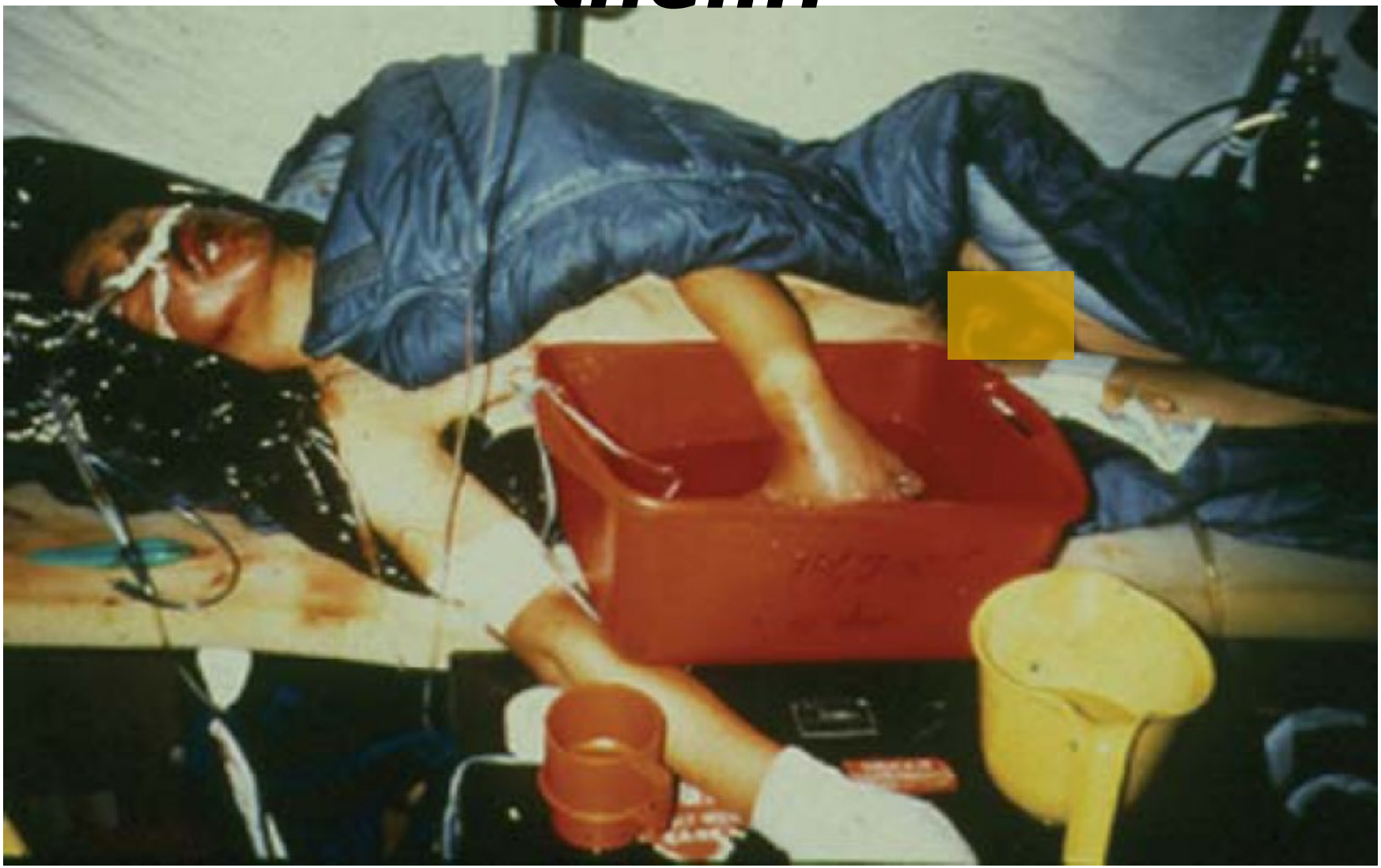
What happens to your body?

- **You either adjust to the altitude (acclimatize) OR you get sick.**
- **Your response to altitude is unique.**
- **You will never perform as well as you do at sea level.**
- **Your response to a given altitude this time may be dramatically different the next time.**

What happens during acclimatization?

- **You breathe faster and deeper.**
- **Your heart rate and blood pressure increase initially; 7-10 days later both decrease.**
- **Your bone marrow will produce more red blood cells.**
- **You experience changes at the cellular level that allow more oxygen to get into action faster.**
- **80% of overall acclimatization occurs in 10 days**
- **95% is achieved after 6 weeks**
- **You may experience periodic breathing in your sleep – you breathe faster and faster until you stop breathing for a short period of time. Scary but normal and not cause for alarm.**

What are the types of altitude illness and how do you treat them?



Acute Mountain Sickness (AMS)

- **Brain illness caused by hypoxia**
- **Headache**
- **Nausea with vomiting in some cases**
- **Loss of appetite**
- **Insomnia**
- **Exhaustion**
- **Unusual fatigue**
- **Dizziness**
- **Shortness of breath during activity that subsides at rest.**

How do I treat AMS?

- **Stop moving up until symptoms resolve.**
- **Hydrate and eat.**
- **Light exercise may alleviate symptoms.**
- **Take ibuprofen and OTC meds to settle the stomach.**
- **Descend 1000 feet (minimum), if symptoms do not resolve in 24-48 hours.**
- **Take Diamox (under supervision of qualified medical personnel).**

High Altitude Cerebral Edema (HACE)

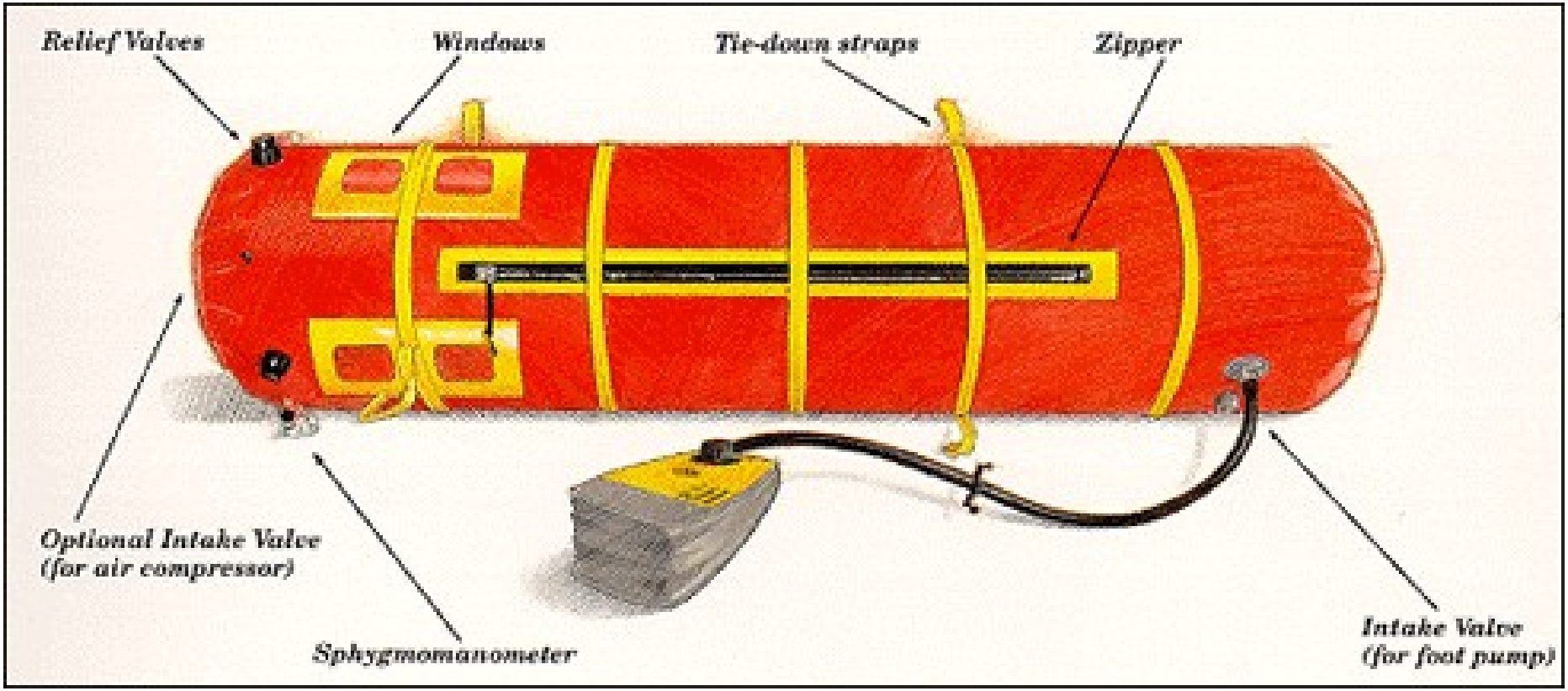
- **Brain swelling – fluid leaks from capillaries into the brain**
- **Ataxia**
- **Altered mental status**
- **Lethargy**
- **Weakness**
- **Vomiting**

Ataxia is the distinguishing characteristic between AMS and HACE.

How do I treat HACE?

- **DO NOT delay treatment. This is a medical emergency.**
- **Move the Soldier down a minimum of 1500 feet immediately.**
- **Administer oxygen and ibuprofen.**
- **Administer Diamox and/or Decadron.**
- **Use a hyperbaric chamber if one is available and/or if immediate descent is delayed.**

Gamow Bag


Relief Valves
Windows
Tie-down straps
Zipper
Optional Intake Valve
(for air compressor)
Sphygmomanometer
Intake Valve
(for foot pump)

High Altitude Pulmonary Edema (HAPE)

- **Fluid leaks from capillaries into the lungs and the lungs fill with fluid.**
- **Sudden decreased ability to exercise.**
- **Dry cough at first.**
- **Productive cough with white or pink frothy sputum in later stages.**
- **Shortness of breath even at rest.**
- **Crackling or gurgling lung sounds.**
- **Increased heart and respiratory rate.**
- **Chest pain.**

How do I treat HAPE?

- **DO NOT delay treatment. This is a medical emergency.**
- **Move the Soldier down a minimum of 1500 feet immediately.**
- **Administer oxygen.**
- **Use a hyperbaric chamber if one is available and if immediate descent is delayed.**

How do I prevent altitude illness?

Before you go:

- ***Get fit. You can train a Soldier to fight in country, but if he shows up unfit, he will NEVER catch up.***

- ***Quit smoking. Smokers habitually under-perform physically as compared to their non-smoking counterparts.***

- ***Ruck march.***
  - ***move at the rate of the slowest Soldier.***
  - ***determine your unit's rate of movement (100-300m/hr).***
  - ***get comfortable with long, slow movements that leave you fit to fight.***

How do I prevent altitude illness?

During operations:

- ***Stay put for 2-3 days if you move to an altitude of 8,000-12,000 feet.***
- ***Work high, sleep low.***
- ***Hydrate. Set a goal of 4 quarts per day.***
- ***Eat a high calorie, high carbohydrate diet.***
- ***DO NOT take sleeping pills, use alcohol or take any drug that suppresses breathing.***

Questions?

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